

SV3-107B

SV3-107B

Gold Star Audio

SERVICE MANUAL

for service technician


Gold Star Co., Ltd.

STEREO CASSETTE RECORDER
with AM/FM RADIO

TSR-900 (FM/SW/MW/LW)

TSR-905 (FM/SW₂/SW₁/MW)

SPECIFICATIONS

This specifications may be changed for improvement of performance without notice.

Radio section

Circuit system Superheterodyne system

Antenna

FM/SW₂/SW Telescopic ant.

SW₁/MW/LW Built-in ferrite bar ant.

Frequency range

FM 88-109 MHz

SW₂ 7-22 MHz

SW 6-18 MHz

SW₁ 2.3-7 MHz

MW 515-1650 KHz

LW 150-350 KHz

Intermediate freq.

AM 455 (465) KHz

FM 10.7 MHz

Sensitivity Max (Usable)

FM 15 (23) dB

SW₂, SW 32 (35) dB

SW₁ 48 (56) dB

MW 48 (54) dB

LW 56 (60) dB

Signal to noise ratio

FM 50 dB

SW₂, SW 35 dB

SW₁ 40 dB

MW 40 dB

LW 36 dB

FM Frequency response . . . 100-1000 Hz (0±6 dB)

FM stereo separation 20 dB

Stereo LED sensitivity . . . 26 dB

Cassette section

Circuit system 4 track 2ch. stereo

Recording system AC Bias (80kHz)

Erasing system AC Erase

Tape speed 4.75 cm/sec

F.F. & REW time 90 sec

Wow & Flutter 0.2% (WRMS)

Frequency response P/B: 100-1200 Hz

REC/PB: 100-10000 Hz

Signal to Noise ratio P/B: 46 dB

REC/PB: 40 dB

Separation 40 dB

General

Power output (10% T.H.D.) . 3.6W + 3.6W

Semiconductors 6IC, 9TR, 8Diode 3LED

Power consumption 18 W

Speaker Tweeter 50mm 3.2Ωx1

Woofer 110mm 3.2Ωx1

Weight 6kg

Dimensions 540(W)x150(H)x233(D) mm

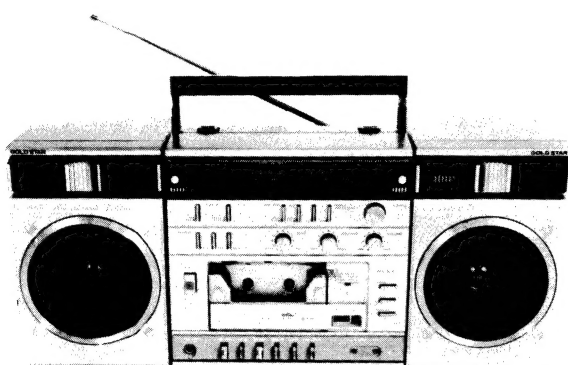
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TSR-905 (FM/SW₂/SW₁/MW)

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Sensitivity Max (Usable)

FM 15 (23) dB

SW₂, SW 32 (35) dB

SW₁ 48 (56) dB

MW 48 (54) dB

LW 56 (60) dB

Signal to noise ratio

FM 50 dB

SW₂, SW 35 dB

SW₁ 40 dB

MW 40 dB

LW 36 dB

FM Frequency response . . . 100-1000 Hz (0±6 dB)

FM stereo separation 20 dB

Stereo LED sensitivity 26 dB

Cassette section

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Erasing system AC Erase

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F.F. & REW time 90 sec

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REC/PB: 100-10000 Hz

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REC/PB: 40 dB

Separation 40 dB

General

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Semiconductors 6IC, 9TR, 8Diode 3LED

Power consumption 18 W

Speaker Tweeter 50mm 3.2Ωx2

Woofer 110mm 3.2Ωx2

Weight 6kg

Dimensions 540(W)x150(H)x233(D)mm

To service technician

The service manual contains detailed service information for Model TSR-900 and TSR-905 with the exception of radio band function.

The basic difference between Model TSR-900 and TSR-905 is radio band.

For example:

Model TSR-900 has the functions of FM, SW, MW and LW.

Model TSR-905 has the functions of FM, SW1, SW2, and MW.

Illustration of the model appears on front cover.

Please give attention to next caution.

The followings are the safety servicing guidelines for all audio amplifiers and radio receivers.

Service work should be performed only after you are familiar with all of the following safety guide.

To do otherwise increases the risk of potential hazards and injury to the user.

Safety guide

1. Be sure that all components are positioned in such a way to avoid possibility of adjacent components shorts. This is especially important on those chassis which are transported to and from the repair shop.
2. Always replace all protective devices such as insulators and barriers after working on a receiver.
3. Check for frayed insulation on wires including the AC-cord. Also check across-the-line components for damage and replace if necessary.
4. All fuses and certain resistors and capacitors which are of the flameproof type must be replaced with exact same types to prevent potential fire hazard.
5. After re-assembly of the set always perform an AC-leakage test on the exposed metallic parts of the cabinet such as the knobs, antenna terminal, etc. to be sure the set is safe to operate without danger of electrical shock.

To order repair parts

Part orders must contain:

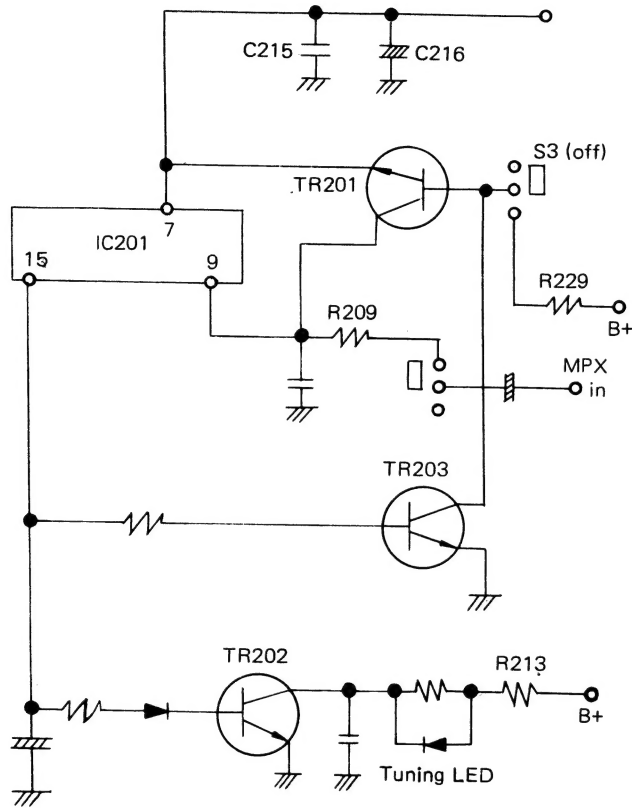
1. Model Number found on front cover in this service manual.
2. Part Number, Description and Quantity.

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CIRCUIT DESCRIPTION

(1) Muting Circuit (TR201 and TR203)



1. When selecting FM broadcasting, white noise appear between station and station.
2. When white noise appear, turn on muting switch (S3), bias is added to TR201 base through R229 and TR201 is turned on.
3. Noise that appear to IC201 Pin 9 is grounded through TR203 (Collector-Emitter) and C215.
4. Receiving a signal for broadcasting, the voltage of IC201 pin 15 will appear in proportion to input signal strength. And then TR203 is turned on, TR201 base is grounded, TR201 is turned off.
5. FM detection output has become MPX input signal through R209.

(2) Tuning LED (TR202)

1. Tuning LED is lighted in the best tuning.
2. When the signal for broadcasting is received, the voltage of IC201 pin 15 appear in proportion to input signal strength, TR202 is turned on.
3. A current that flow through R213 and TR202 (Collector-Emitter) light tuning LED.

DIAL CORD ARRANGEMENT

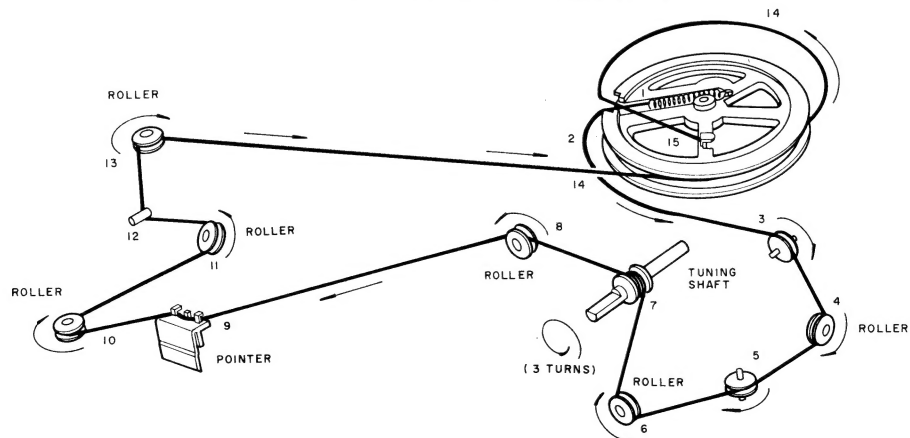


Fig. 1.

Set the varicon to minimum frequency and string the cord by following the number sequence order as shown in Fig. 1.

ALIGNMENT INSTRUCTIONS

This cassette radio has been aligned at the factory and normally will not require further adjustment. As a result, it is not recommended that any attempt is made to modify any circuit. If any parts are replaced or if anyone tampers with the adjustment, realignment may be necessary.

Test equipment required

1. AM/FM signal generator
2. IF sweep generator (10.7 MHz) for FM
3. IF sweep generator (455 kHz or 465 kHz) for AM (SW₂, SW₁, MW and LW)
4. Standard dummy antenna for FM & SW₂
5. Standard loop antenna for AM (SW₁, MW and LW)
6. VTVM
7. Oscilloscope
8. Frequency counter

1. RADIO ALIGNMENT

Adjustment points (TSR-900)

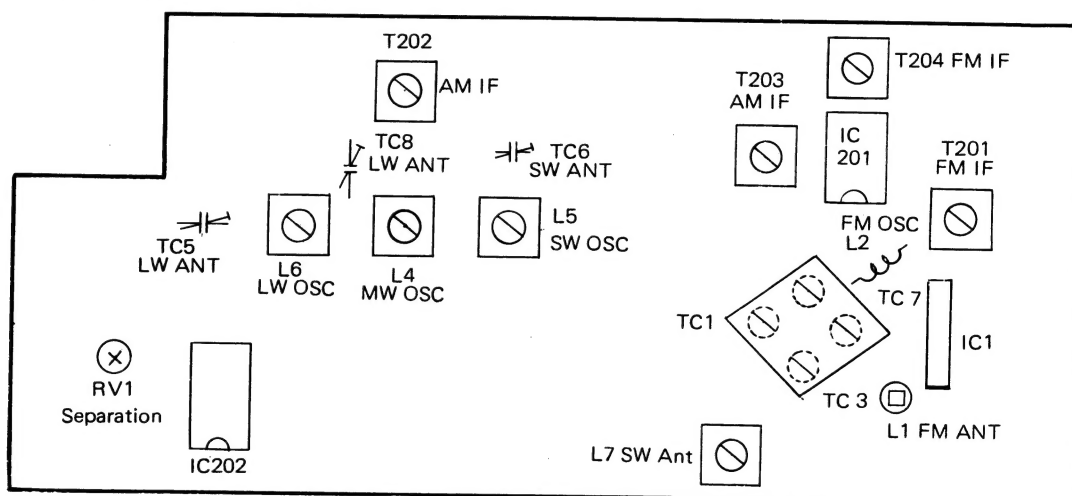


Fig. 2 RF PCB

Adjustment and test points (TSR-905)

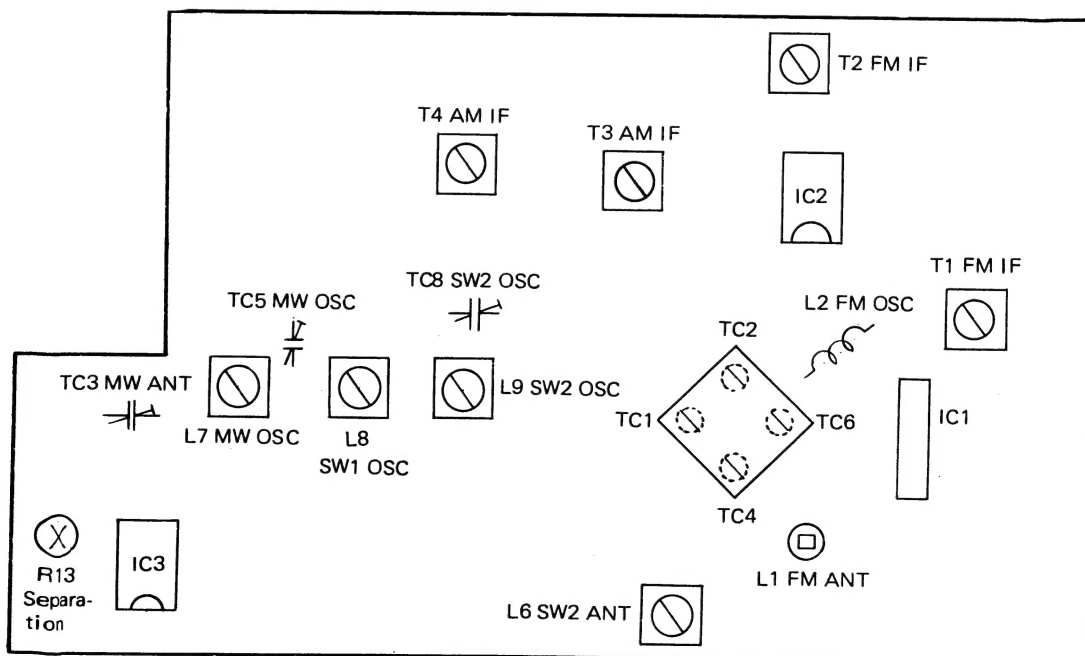


Fig. 3 RF PCB

Note 1.: Adjust T202 (T4) and T203 (T3) to get maximum gain and symmetry in IF response as shown in Fig. 4.

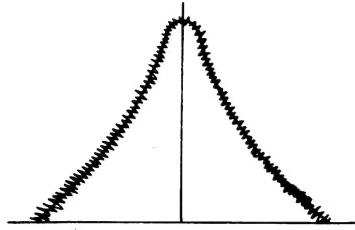


Fig. 4

IF response for weak input signal.

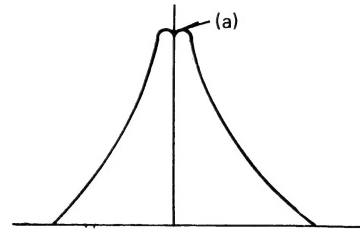


Fig. 5

IF response for strong input signal.

After adjust IF response for weak input signal, supply strong input signal and also adjust T202 (T4) and T203 (T3) to make part (a) flat as shown in Fig. 5.

Note 2. : Adjust output of sweep generator so that noise appears on IF-curve as shown in Fig. 6 below and adjust T201 (T1), for maximum indication.

Note 3. : Adjust T204 (T2) to be IF-curve into S-curve (See Fig. 7) and adjust T204 (T2) so that declined part of S-curve has to be just linear.

If ceramic filter is used in RF part, adjust T204 (T2) so that part (A) and part (B) are symmetrical on either side of vertical line, because the marker of 10.7MHz on sweep generator is not on the center of S-curve.

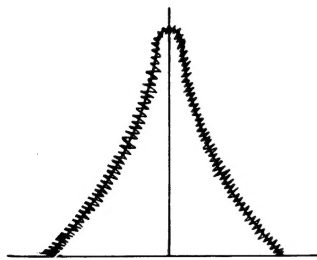


Fig. 6

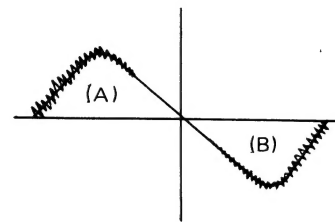
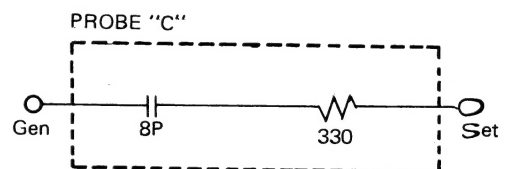
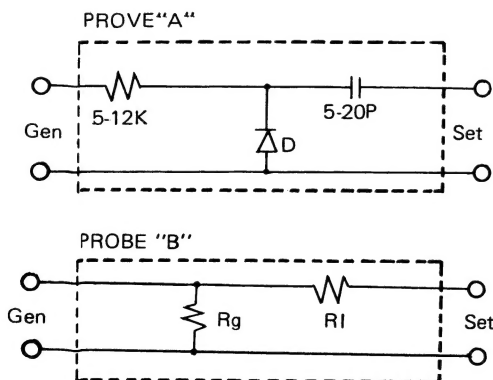


Fig. 7



Fg: FM SSG Output

$$RI: 75 \cdot \frac{Rg}{2}$$

AM ALIGNMENT CHART

Step	Item	Instrument & Frequency	Test Point		Dummy Ant.	Dial Setting	Adjustment Point TSR-900 (TSR-905)	Purpose
			Input Terminal	Output Terminal				
1	AM-IF	AM IF sweep generator and oscilloscope or AM IF genescope	AM IF Input	Detector output	Generator output Probe "A"	Tuning-Gang counter-clockwise (Lowest freq.)	T202 (T4) T203 (T3)	Adjust for the scope pattern with specified marker (IF freq.) as illustrated in fig. 4 (Note 1)
2	MW Oscillator	a AM SSG 515KHz (400Hz, 30% Mod) and VTVM	MW wave magnet ant.	Speaker output or detector output	None	Tuning-Gang counter-clockwise (Lowest freq.)	L4 (L7)	Adjust for maximum gain.
		b AM SSG 1650KHz (400Hz, 30% Mod) and VTVM				Tuning-Gang clock wise (Highest freq.)	TC7 (TC5)	
		c Repeat the above item 2-(a), (b) for minimum change.						
3	MW Tracking	a AM SSG 600KHz (400Hz, 30% Mod) and VTVM	MW wave magnet ant.	Speaker output terminal or detector output	None	Tune to signal	L3 (L4) MW ant. coil	Adjust for maximum gain.
		b AM SSG 1400KHz (400Hz, 30% Mod) and VTVM					TC3	
		c Repeat the above item 3-(a), (b) for minimum change						
4	LW (SW1) OSC	a AM SSG 150KHz (2.3MHz) (400Hz, 30% Mod) and VTVM	LW (SW ₁) wave magnet ant.	Speaker output terminal or detector output	None	Tuning gang fully counter clockwise (Lowest fre.)	L6 (L8)	Adjust for maximum gain.
		b AM SSG 350KHz (7.0MHz) (400Hz, 30% Mod) and VTVM				Tuning gang fully clockwise (Highest fre.)	TC8 (TC6)	
		c Repeat the above item 4-(a), (b) for minimum change.						

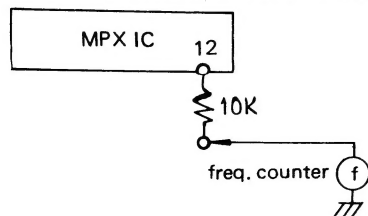
AM ALIGNMENT (Cont'd)

Step	Item	Instrument & Frequency	Test Point		Dummy Ant.	Dial Setting	Adjustment Point TSR-900 (TSR-905)	Purpose
			Input Terminal	Output Terminal				
5	LW (SW ₁) Tracking	a AM SSG 160KHz (2.7MHz) (400Hz, 30% Mod) and VTVM	LW (SW ₁) wave magnet ant	Speaker Output terminal or detector out put	None	Tune to signal	L3 (L5)	Adjust for maximum gain.
		b AM SSG 330KHz (6.3MHz) (400Hz, 30% Mod) and VTVM					TC5 (TC4)	
		c Repeat the above item 5-(a), (b) for minimum change.						
6	SW (SW ₂) OSC	a AM SSG 6MHz (7MHz) (400Hz, 30% Mod) and VTVM	Ant. input	Sp. output ter, or detector output	SW dummy ant (Probe "C")	Tuning gang fully counter clockwise (Lowest fre.)	L5 (L9)	Adjust for maximum gain.
		b AM SSG 18 MHz (22MHz) (400Hz, 30% Mod) and VTVM				Tuning gang fully clockwise (Highest fre.)	TC6 (TC8)	
		c Repeat the above item 6 -(a), (b) for minimum change.						
7	SW (SW ₂) Track- ing	a AM SSG 6.5MHz (8MHz) (400Hz, 30% Mod) and VTVM	Ant input	Speaker output ter. or detector output	SW dummy ant. (Probe "C")	Tune to signal	L7 (L6)	Adjust for maximum gain.
		b AM SSG 16MHz (20MHz) (400Hz, 30% Mod) and VTVM						
		c Repeat the above item 7-(a), (b) for minimum change.						

FM ALIGNEMENT CHART

Step	Item		Instruments & Frequency	Test Point		Dummy Ant.	Dial Setting	Adjustment Point TSR-900 (TSR-905)	Purpose
				Input Terminal	Ouput Terminal				
1	FM-IF		FM IF Sweep Generator and oscilloscope or FM IF generating	FM-IF Input	FM Det Output	Generator Output probe "A"	Tuning Gang fully counter-clockwise (Lowest Fre.)	T201 (T1)	Adjust for scope Pattern with specified marker (10.7 MHz) as illustrated in Fig. 6 & 7 (note 2, 3)
	S-Curve							T204 (T2)	
2	FM Oscillator	a	FM SSG 87 MHz (400Hz 22.5 KHz Deviation) and VTVM	Ant Input	Speaker Output Terminal	Gernator Output Probe "B"	Tuning Gang fully counter-clock wise (Lowest fre.)	L2	Adjust for maximum gain.
		b	FM SSG 109 MHz (400Hz, 22.5 KHz Deviation) and VTVM	Ant Input	Speaker Output Terminal	Generator Output Probe "B"	Tuning Gang fully clockwise (Highest fre.)	TC2	Adjust for maximum gain.
		c	Repeat the above item 2-(a), (b) for minimum change.						
3	FM Tracking	a	FM SSG 90 MHz (400Hz, 22.5KHz Deviation) and VTVM	Ant Input Terminal	Speaker Output Termainal	Generator Output Probe "B"	Tune to signal	L1	Adjust for maximum gain.
		b	FM SSG 106 MHz (400Hz, 22.5KHz Deviation) and VTVM	Ant Input Terminal	Speaker Output Terminal	Generator Output Probe "B"	Tune to signal	TC1	Adjust for maximum gain
		c	Repeat the above item 3-(a), (b) for minimum change.						

FM MULTIPLEX ALIGNMENT



Adjustment TSR-900 (TSR-905)	Remarks
RV1 (R13)	Frequency counter should read 19KHz±0.1KHz

2. CASSETTE ALIGNMENT

Tape head and capstan cleaning

1. Periodically clean the tape head, capstan drive shaft and other tape handling surfaces to insure proper tape handling and optimum frequency response.
2. Use a cotton swab dipped in head cleaner or denatured alcohol to clean all tape handling surfaces.
Wipe dry.

Tape head demagnetization

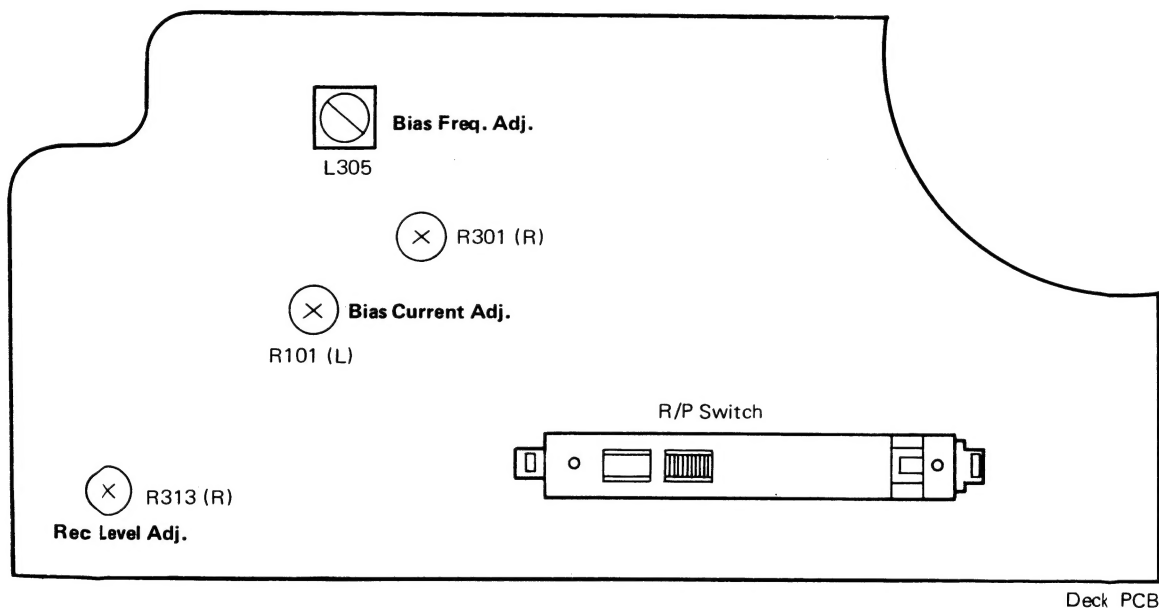
When servicing tape unit, do not use magnetized screwdrivers or wrenches near the tape head since they can magnetize the head.

A magnetized head will result in loss of high frequency response and increased noise.

Head adjustment

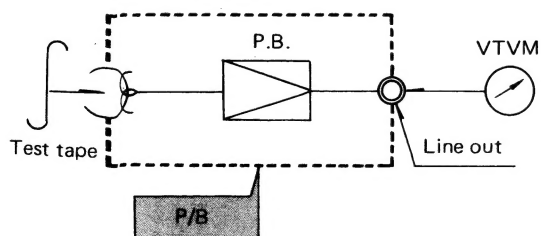
Head adjustment is normally required when the head is replaced or for cases of cross-talk and poor high frequency response.

Adjustment points



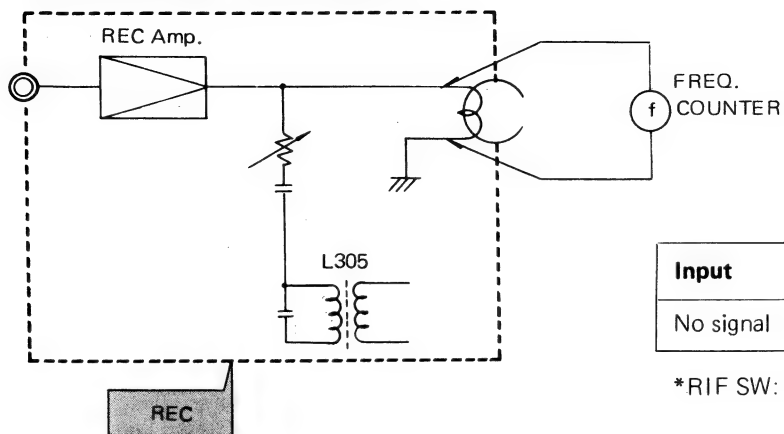
Deck PCB

AZIMUTH ADJUSTMENT



Input	Adjust for	Adjustment
MTT-114 (10kHz)	Maximum	Azimuth Adjusting Screw

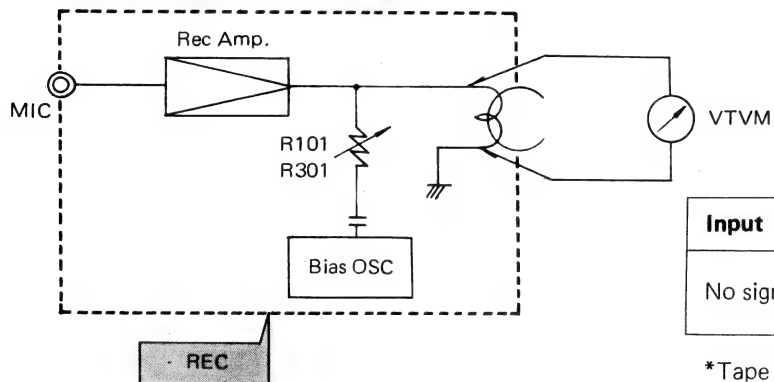
BIAS FREQUENCY ADJUSTMENT



Input	Adjust for	Adjustment
No signal	60±3kHz	L305

*RIF SW: "OFF" position

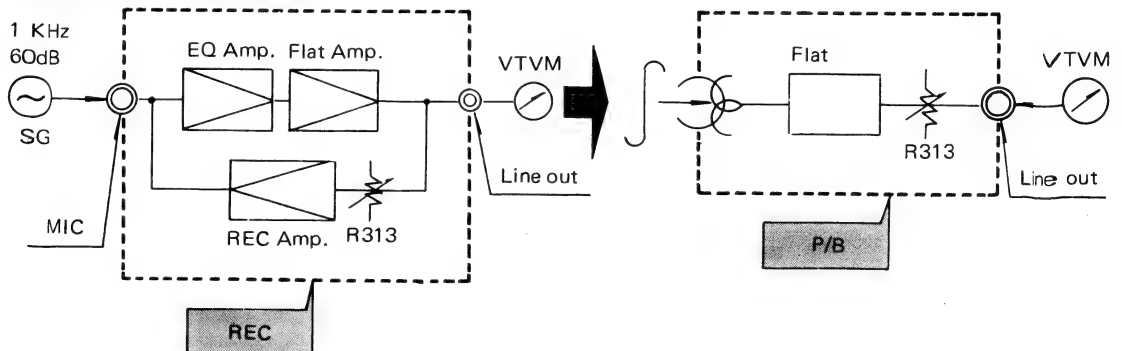
BIAS CURRENT ADJUSTMENT



Input	Adjust for	Adjustment
No signal	AC : 14V	L: R101 R: R301

*Tape selector : normal

REC LEVEL ADJUSTMENT

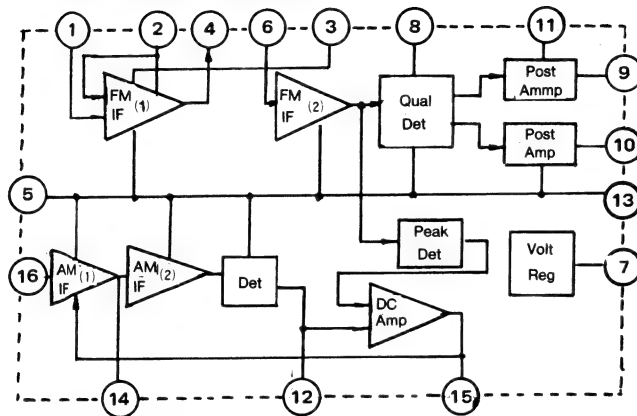


No	Input	Adjust for	Adjustment	Remark
1 (Rec/P.B)	1kHz -60dB	the same L.ch Value	R313 (100K)	*

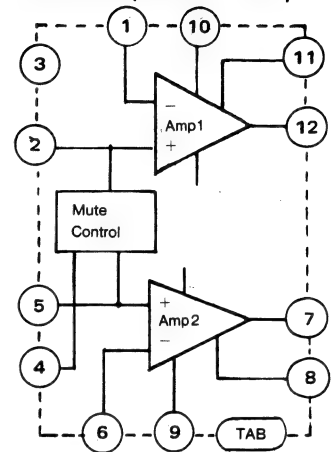
*After recording and playback, R.ch should be the same L.ch value.

IC BLOCK DIAGRAM

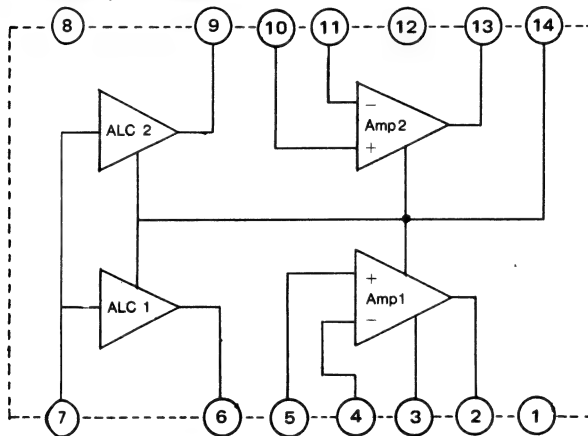
HA 12413 (FM/AM IF)



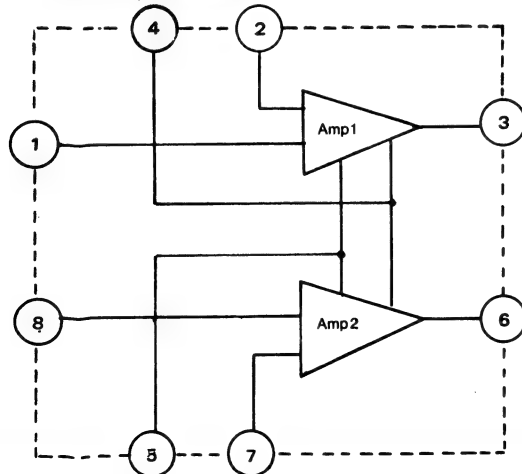
HA1392 (POWER AMP)



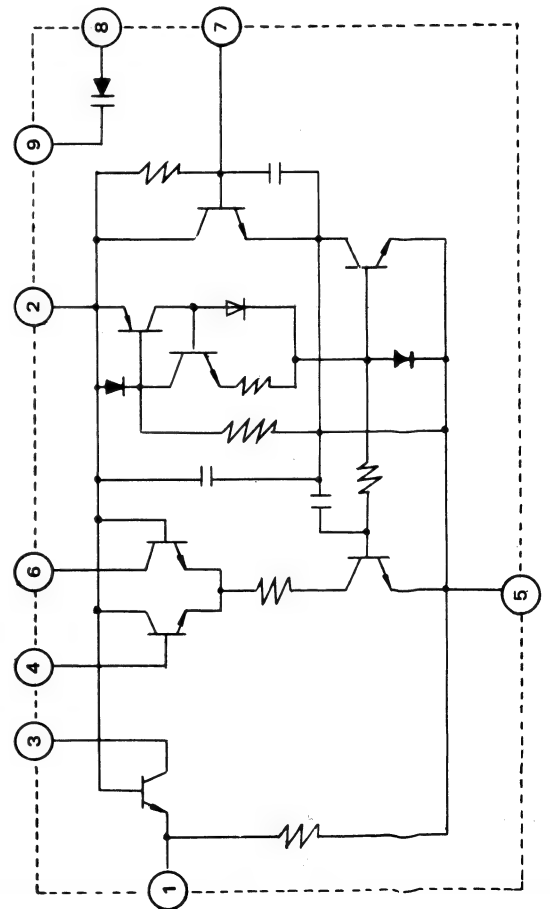
LA3220 (EQ AMP)



KA1222 (EQ AMP)



TA7335P (FM FRONT END)



ELECTRICAL PARTS LIST

DECK PWB AY

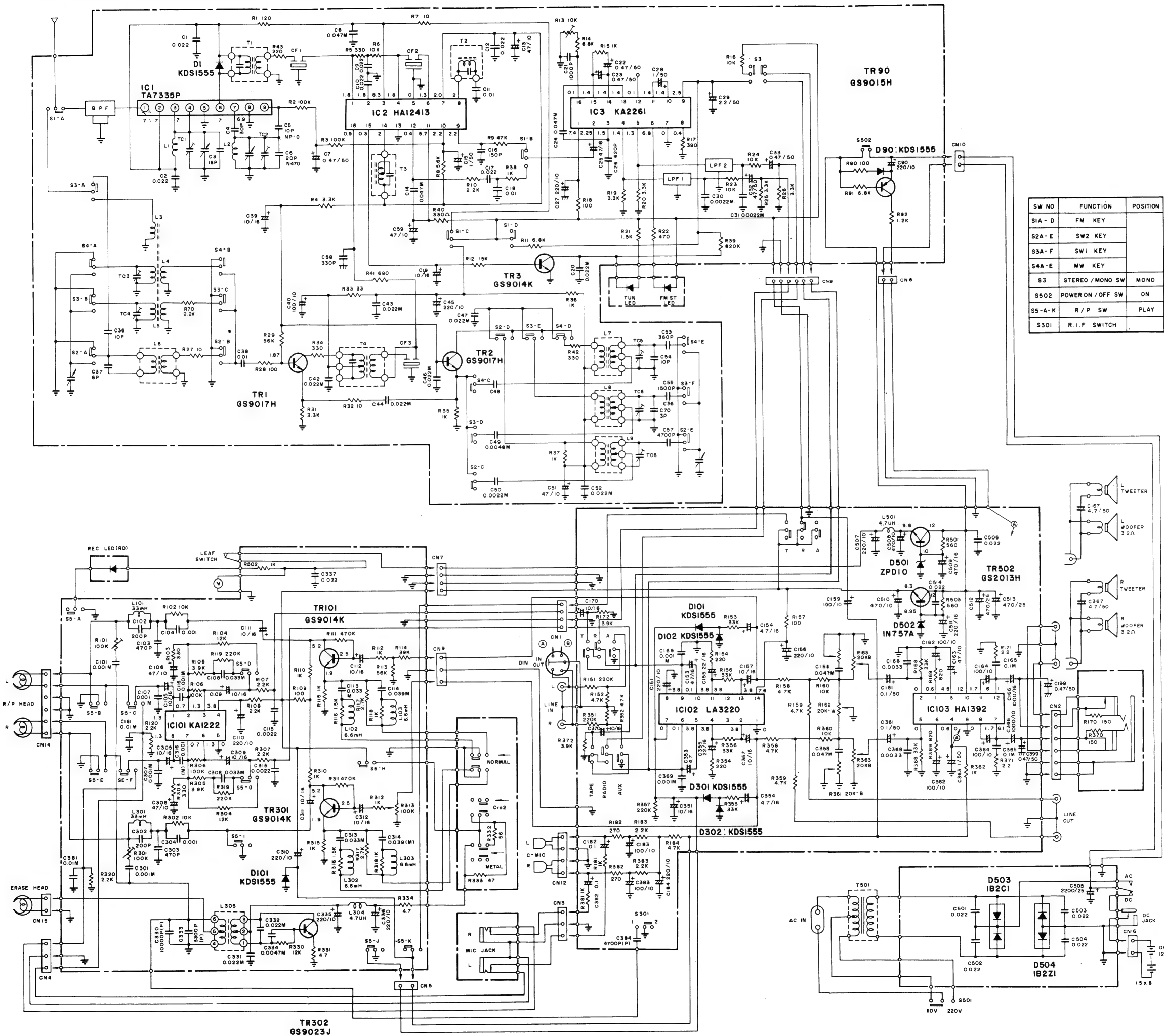
NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
1	IC101	668-110A	IC KA1222 (EQ)	30	C101, 301, 107 307, 116, 316	CQ102M01	C, POLYESTER 0.001MF-M 50V
2	TR101, 301	661N004F	TRANSISTOR GOLDSTAR GS9014K	31	C103, 303	CC471K01	CERAMIC CC 470PF-K
3	TR302	665-886D	TRANSISTOR GOLD STAR GS9023J	32	C104, 304	CK102Z02	C, CERAMIC CK 1000PF-Z 50V
4		552-619A	SW, SLIDE 1220102 TAEKWANG-3	33	C330	CY103J03	C, POLYSTYROL 10000PF JR 100V
5	L305	634NO36C	COIL OSC TAPE RECORDER	34	C333	CY332J03	C, POLYSTYROL 3300PF-JR 125V
6	L101, 301	637N005B	COIL PEAKING 33MH	35	C334	CQ472M01	C, POLYESTER 0.0047MF-M 50V
7	L102, 103, 302 303	639-620F	COIL PEAKING 6.6MH	36	C181, 381	CQ103M01	C, POLYESTER 0.01MF-M 50V
8	L304	639N0031	COIL PADDING	37	C331, 332, 337	CQ223M01	C, POLYESTER 0.022MF-M 50V
9	R101, 301, 313	613N002J	VR, SEMI-FIXED SR19R-100KB	38	C108, 113, 308 313	CQ333M01	C, POLYESTER 0.033MF-M 50V
10	R331	RD4R7J22	R, CARBON FILM 4.7-J 1/4W	39	C114, 314	CQ393M01	C, POLYESTER 0.039MF M50V
11	R109	RD101J22	R, CARBON FILM 100J 1/4W	40	C105, 109, 111, 305, 309, 311	CE106C01	C, ELECTROLYTIC 10MF-16V
12	R103, 303	RD331J22	R, CARBON FILM 330J 1/4W	41	C112, 312	CE106C01	C, ELECTROLYTIC 10MF-16V
13	R110, 310, 112 312, 115, 315	RD102J22	R, CARBON FILM 1K-J 1/4W	42	C106, 306	CE476B01	C, ELECTROLYTIC 47 MF 10V
14	R118, 318, 502	RD102J22	R, CARBON FILM 1K-J 1/4W	43	C110, 310, 335, 336	CE227B01	C, ELECTROLYTIC 220MF 10V
15	R116, 316	RD152J22	R, CARBON FILM 1.5KJ 1/4W	44	C115, 315	CC561K01	C, CERAMIC CC 560PF-K SL 50V
16	R117, 317	RD272J22	R, CARBON FILM 2.7K-J 1/4W	45	R120, 320	RD222J02	R, CARBON-FILM 2.2K-J 1/4WR
17	R304, 330	RD123J22	R, CARBON FILM 12K-J 1/4W	46	R111, 311	RD474J22	R, CARBON FILM 470K-J 1/4W
18	R105	RD392J02	R, CARBON, FILM 3.9K-J 1/4WR	47	REC LED	653-031A	LED STANLEY SPR4632REC RD
19	R305	RD392J02	R, CARBON, FILM 3.9K-J 1/4WR	48	TAPF SELECTOR SWITCH	554-617A	SW PUSH R2200610N(2P-3K)-LR
20	R102, 302	RD103J22	R, CARBON FILM 10K-J 1/4W	49	R332	RD560-J22	R, CARBON FILM 56J 1/4W
21	R114	RD273J22	R, CARBON FILM 27K-J 1/4W	50	R333	RD470J22	R, CARBON FILM 47-J 1/4W
22	R113	RD563J22	R, CARBON FILM 56K-J 1/4W	51	J101 (HEAD PHONE JACK)	572-159D	JACK D=6.4 HLJ0305-01-040
23	R319	RD224J22	R, CARBON FILM 220K-J 1/4W	52	R170, 370	RD151J02	R, CARBON FILM 150-J 1/4WR
24	R106, 306	RD104J22	R, CARBON FILM 100K-J 1/4W	53	MIC JACK	572-042A	JACK D = 3.5 HSJ0785 - 01 - 030
25	R107, 307, 108	RD222J22	R, CARBON FILM 2.2K-J 1/4W	54	D103	652-015B	DIODE DETECT KDS1555
26	R104	RD123J02	CARBON FILM 12KJ 1/4WR				
27	R119	RD224J02	R, CARBON FILM 220K-J 1/4WR				
28	R334	RD4R7J01	R, CARBON-FILM 4.7-J 1/4WP				
29	C102, 302	CC201J01	C, CERAMIC CC 200PF-J 3L 50V				

Fig. 1

SW NO	FUNCTION	POSITION
S1-1-19	BANDSWITCH	MW
S2	STEREO. MONO SW	MONO
S5-02	POWER ON/OFF SW	ON
S5-A-K	R / P SW	PLAY
S301	R.I.F. SWITCH	

SW NO	FUNCTION	POSITION
S1 - I - 19	BANDSWITCH	MW
S2	STEREO. MONO SW	MONO
S 5 02	POWER ON/OFF SW	ON
S5 - A - K	R / P SW	PLAY
S301	R . I . F SWITCH	

SCHEMATIC DIAGRAM (MODEL TSR-905)



AUDIO PWB AY

NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
1	IC 102	668-163A	IC LA 3220 (EQ)	26	R151, 351	RD224J22	R, CARBON FILM 220K-J 1/4W
2	IC 103	668-625A	IC HA,1392 (AUDIO)	27	R357	RD334J22	R, CARBON FILM 330K-J 1/4W
3	TR501, 502	661N027A	TRANSISTOR GOLD STAR GS-2013H	28	C514	CQ223M01	C, POLYESTER 0.022MF-M 50V
4	D501	654-612B	DIODE ZENER ZPD10	29	C165	CQ104M01	C, POLYESTER 0.1 MF-M 50V
5	D502	654-217A	DIODE ZENER IN757A	30	C384	CY472J03	C, POLYSTYROL 4700PF-J R-125V
6	D101, 102, 301, 302	652-015B	DIODE DETECT KDS1555 TOSHIBA	31	C168, 368	CQ332M01	C, POLYESTER 0.0033MF-M 50V
7	R161, 163 (VOLUME/TONE)	611-608D	VR, K 162800-20KBX2	32	C169, 369	CQ102M01	C, POLYESTER 0.001MF-M 50V
8	R162	611-607C	VR K161100-20KW	33	C158, 358	CQ473M01	C, POLYESTER 0.047 MF-M 50V
99	FUNCTION (TAPE/RADIO/AUX)	554-613F	SW, UNI-PUSH SUF32	34	C365	CQ104M01	C, POLYESTER 0.1MF-M 50V
10	S301(RIFSWITCH)	552N020A	SWITCH, SLIDE	35	C161, 361, 182 382	CE104F01	C, ELECTROLYTIC 0.1MF 50V
11	LINE IN/OUT	573-080B	SOCKET AY	36	C363	CE105F01	C, ELECTROLYTIC 1MF 50V
12	SPEAKER JACK	573-049B	JACK BLOCK, 2PIN S-049B	37	C153, 353, 154, 354	CE475C01	C, ELECTROLYTIC 4.7MF-16V
13	L501	639N0031	COIL PADDING	38	C351, 157, 357, 170, 370	CE106C01	C, ELECTROLYTIC 10MF-16V
14	R171, 371	RD2R2J09	R, CARBON FILM 2.2-J1/4WM	39	C155, 355	CE226C01	C, ELECTROLYTIC 22MF-16V
15	R154, 354	RD221J22	R, CARBON FILM 220J 1/4W	40	C162, 362, 164, 364, 183, 383	CE107B01	C, ELECTROLYTIC 100MF-10V
16	R157	RD101J22	R, CARBON FILM 100J 1/4W	41	C163	CE476B01	C, ELECTROLYTIC 47MF 10V
17	R169, 369	RD821J22	R, CARBON FILM 820J 1/4W	42	C151, 156, 184 507	CE227B01	C, ELECTROLYTIC 220MF 10V
18	R182, 382	RD271J22	R, CARBON FILM 270J 1/4W	43	C511	CE227C01	C, ELECTROLYTIC 220MF 16V
19	R501, 503	RD561J22	R, CARBON FILM 560J 1/4W	44	C508, 510	CE477B01	C, ELECTROLYTIC 470MF 10V
20	R172, 372	RD392J22	R, CARBON FILM 3.9K-J 1/4	45	C512, 513	CE477D01	C, ELECTROLYTIC 470MF 25V
21	R181, 381, 362	RD102J22	R, CARBON FILM 1K-J 1/4	46	C166, 366	CE108B01	C, ELECTROLYTIC 1000MF 10V
22	R183, 383	RD222J22	R, CARBON FILM 2.2K-J 1/4W	47	C509	CE477C01	C, ELECTROLYTIC 470MF 16V
23	R152, 352, 158, 358, 159, 359, 184	RD472J22	R, CARBON FILM 4.7K-J 1/4W	48	TUN LED	653-031A	LED STANLEY SPR 4632REC RD
24	R160, 360	RD103J22	R, CARBON FILM 10K-J 1/4W	49	STEREO LED	653-031B	LED STANLEY SPG4632XREC GN
25	R153, 353, 156, 168, 368	RD333J22	R, CARBON FILM 33K-J 100MF-10V	50		542N023A	CONDENSER MIC EM-80 PRIMO

POWER PWB AY

NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
1	D503	652-021A	DIODE RECT 1B2C1	6	F502	585-116B	FUSE 250V 315mA
2	D504	652-021B	DIODE RECT 1B2Z1	7	C505	CE228D01	C, ELECTROLYTIC 2200MF 25V
3		573N066A	SOCKET AC-IN	8	C501, 502, 503, 504	CK223Z02	C, CERAMIC CK 0.022MF -Z 50V
4		586-101A	FUSE HOLDER				
5							

RF PWB AY (TSR-900)

NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
1		622N053A	VARICON POLY P2Z-22BPT	23	R42	RD270J09	R, CARBON FILM 27-J1/4
2	MW/FM/LW/SW	554-613B	SW, UNI-PUSH SUF42	24	R33	RD330J09	R, CARBON FILM 33-J1/4
3	POWER/MODE	554-613G	SW, UNI-PUSH	25	R17	RD101J09	R, CARBON FILM 100-J1/4
4	IC1	668-111A	IC TA7335P (FM FNT)	26	R39	RD121J09	R, CARBON FILM 120-J1/4
5	IC201	668-161A	IC HA12413 (AM/FM IF)	27	R4	RD331J09	R, CARBON FILM 330-J1/4
6	IC202	668-162B	IC KA2261 (MPX)	28	R24	RD391J09	R, CARBON FILM 390-J1/4
7	TR1	661N007D	TR, GOLD STAR GS9017H	29	R16, 34, 35, 36, 38	RD102J09	R, CARBON FILM 1K-J1/4
8	TR202	661N004F	TR, GOLD STAR GS9014K	30	R9	RD222J09	R, CARBON FILM 2.2K-J1/4
9	D2, 3	652-015B	DIODE DETECT KDS1555	31	R6, 20, 21, 32	RD332J09	R, CARBON FILM 3.3K-J1/4
10	BPF1	616-011A	FILTER BAND PASS PFWB2	32	R18, 19, 45	RD392J09	R, CARBON FILM 3.9K-J1/4
11	LP1, LP2	616-009A	FILTER CERAMIC B3BN4103-32	33	R8	RD562J09	R, CARBON FILM 5.6K-J1/4
12	CF1, CF2	616-007A	FILTER CERAMIC SFE10.7MA8	34	R5, 10, 22, 23	RD103J09	R, CARBON FILM 10K-J1/4
13	CF3	616-003E	FILTER CERAMIC SFU 465B	35	R12, 44	RD123J09	R, CARBON FILM 12K-J1/4
14	L1	635N003B	COIL RF FM	36	RV1	613N002F	VR, SEMI-FIXED 19R-10KB
15	L2	635-009L	COIL RF FM	37	R40	RD221J09	R, CARBON FILM 220-J1/4
16	L4	634N015C	COIL OSC	38	R26	RD331J02	R, CARBON FILM 330-J1/4
17	T201	644N018F	TRANS, IF	39	R13	RD152J09	R, CARBON FILM 1.5K-J1/4
18	T204	647N011E	DISCRIMINATOR	40	C4	CC100C06	C, CERAMIC CC 10PF-C CH 50V
19	T202	644N039M	TRANS IF	41	C2	CC200J12	C, CERAMIC CC 20PF-J TH 50V
20	T203	644N039N	TRANS IF	42	C1	CC200K01	C, CERAMIC CC 20PF-K SL 50V
21	L3	632-042B	COIL ANT MW/LW	43	C3	CC300K01	C, CERAMIC CC 30PF-K
22	R7, 43	RD100J09	R, CARBON FILM 10-J1/4	44	C21	CC151K01	C, CERAMIC CC 150PF-K

NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
45	C55	CC561K01	C, CERAMIC CC 560PF-K SL 50V	65	L5	634N037F	LW OSC COIL
46	C23	CY102J01	C, POLYSTYROL 1000PF-JR	66	L7	634N020F	SW ANT COIL
47	C35, 56	CK103Z02	C, CERAMIC CK 0.01 MF- Z 50V	67	R27	RD561J09	R, CARBON FILM 560-J1/4
48	C5, 7, 9, 37, 38, 57	CK223M01	C, CERAMIC CK 0.022MF-Z 50V	68	R30	RD563J09	R, CARBON FILM 56K-J1/4
49	C10, 15, 22, 40, 42, 45, 46	CQ223M01	C, POLYESTER 0.022MF-M 50V	69	R1, 2	RD104J09	R, CARBON FILM 100K-J1/4
50	C33, 49	CC100D01	C, CERAMIC CC 10PF-D SL 50V	70	R11	RD473J09	R, CARBON FILM 47K-J1/4
51	C17, 19, 20, 26, 58	CQ473M01	C, POLYESTER 0.047MF-M 50V	71	R25	RD471J09	R, CARBON FILM 470-J1/4
52	C43	CQ102M01	C, POLYESTER 0.001MF-M 50V	72	R14, 15	RD682J09	R, CARBON FILM 6.8K-J1/4
53	C34, 53	CC120J01	C, CERAMIC CC 12PF-J SL 50V	73	R41	RD684J02	R, CARBON FILM 680K-J1/4
54	C50	CC820K01	C, CERAMIC CC 82PF-K SL 50V	74	C8, 27, 28, 62, 63	CE474F01	C, ELECTROLYTIC 0.47MF 50V
55	C54	CY201J01	C, POLYSTYROL 200PF-J R	75	C31, 60	CE105F01	C, ELECTROLYTIC 1MF 50V
56	C48	CC030D01	C, CERAMIC CC 3PF-D SL 50V	76	C16	CE475C01	C, ELECTROLYTIC 4.7MF-16V
57	C52	CY361J01	C, POLYSTYROL 360PF-J R	77	C11, 13	CE106C01	C, ELECTROLYTIC 10MF-16V
58	C51	CY472J01	C, POLYSTYROL 4700PF-J	78	C12, 18, 36	CE476B01	C, ELECTROLYTIC 47MF-10V
59	C6	CC301K01	C, CERAMIC CC300PF-K SL 50V	79	C61	CE107B01	C, ELECTROLYTIC 100MF 10V
60	C32	CC080D01	C, CERAMIC CC 8PF-D SL 50V	80	C25, 39, 41	CE227B01	C, ELECTROLYTIC 220MF 10V
61	TC5, 8	623-023H	TRIMMER T1-1-20	81	C44	CQ103M01	C, POLYESTER 0.01MF-M 50V
62	TC6	623-023B	TRIMMER T1-1-8	82	C29, 30	CQ222M01	C, POLYESTER 0.0022MF-M 50V
63	TR2	661N007C	TR, GOLD STAR GS9017G	83	C47	CQ682M01	C, POLYESTER 0.0068MF 50V
64	L6	634N020E	SW OSC COIL	84	R29	RD470J09	R, CARBON FILM 47-J1/4

RF PWB AY (TSR-905)

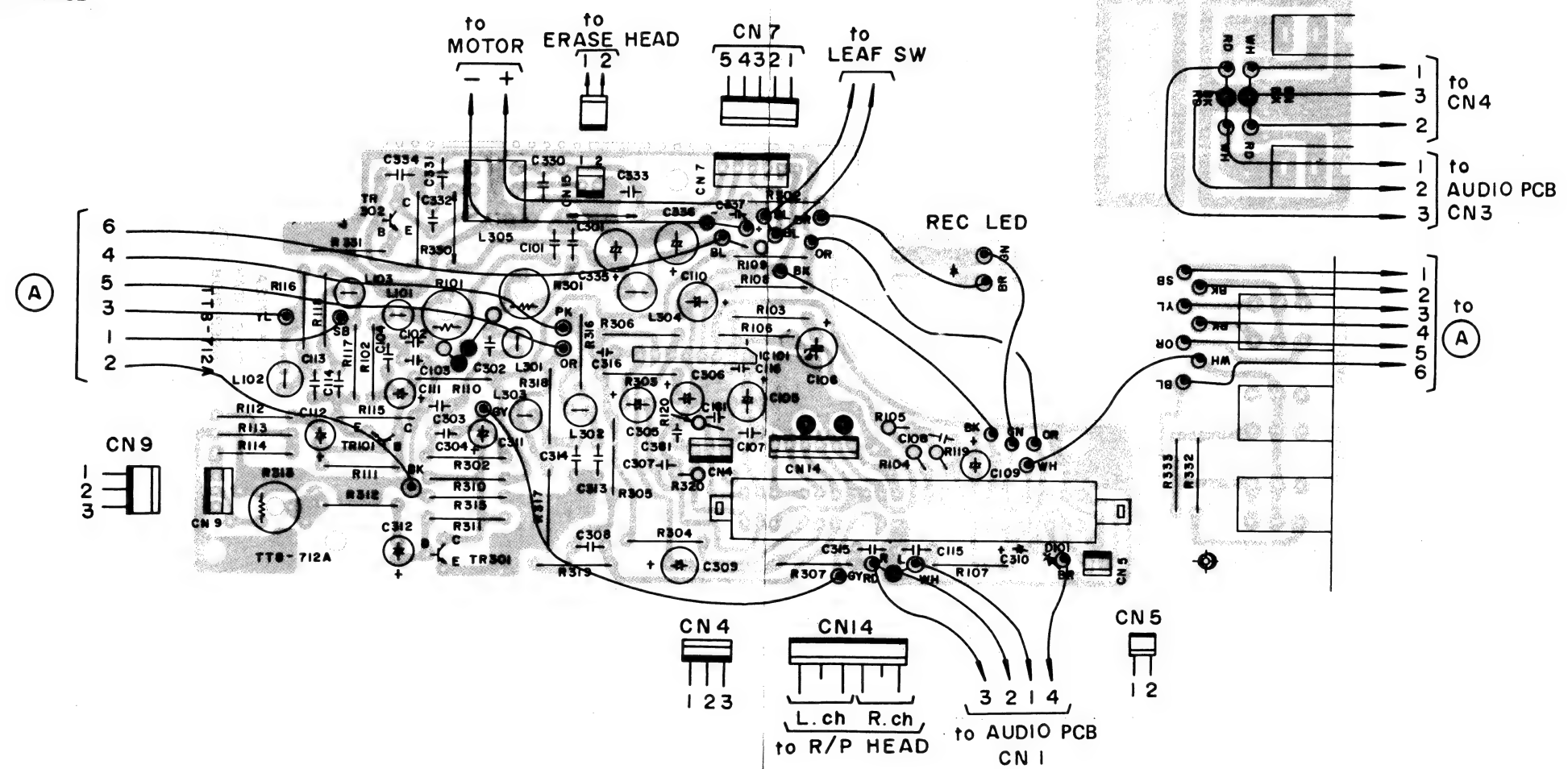
NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
1		622N053A	VARICON POLY P27-22BPT DM	10	D1, 90	652-015B	DIODE DETECT KES1555 TOSHIBA
2	MW/SW ₁ /SW ₂ /FM	554-613B	SW, UWI-PUSH SUF42H=12.5	11	BPF1	616-011A	FILTER BAND PASS PFWB2
3	POWER/MODE	554-613G	SW, UWI-PUSH+SDWA H=12.5SUF32	12	LPI, LP2	616-009A	FILTER CERAMIC 83B4103-32
4	1C1	668-111A	IC TA7335P (FM FNT)	13	CF1, CF2	616-008A	FILTER CERAMIC SFE10, 7MS 2-M
5	1C2	668-161A	IC HA12413 (AM/FM IF)	14	CF3	616-003D	FILTER CERAMIC SFU455B
6	1C3	668-162B	IC KA2261 (MPX)	15	L1	635-013B	COIL RF FM
7	TR1, TR2	661N007D	TR GOLDSTAR GS9017H	16	L2	635-009L	COIL RF FM 2.5TURN
8	TR3	661N004F	TR GOLDSTAR GS9014K	17	L7	634-015C	COIC OSC MW7
9	TR90	661N005D	TR GOLDSTAR GS9015H	18	T1	644-018F	TRANS IF FM7

NO.	SYMBOL NO.	PART NO.	DESCRIPTION	NO.	SYMBOL NO.	PART NO.	DESCRIPTION
19	T2	647-011E	DISCRIMINATOR7	51	C11, 18, 38	CK103Z02	C, CERAMIC CK 0.01MF-Z 50V
20	T4	644-039M	DISCRIMINATOR7	52	C1, 2, 9, 10, 12	CK223Z02	C, CERAMIC CR 0.022MF-Z 50V
21	T3	644-039N	TRANS IF MW7	53	C17, 20, 42, 43	CQ223M01	C, POLYESTER 0.022MF-M 50V
22	L3, L4, L5	632-202D	COIL ANT MW/SW		44, 46, 47, 52		
23		525-102D	COIL SW QM201 AR10x140	54	C8, 24	CQ473M01	C, POLYESTER 0.047MF-M 50V
24	R7, 27, 32	RD100J09	R, CARBON FILM 10-J1/4WM	55	C30, 31, 50	CQ222M01	C, POLYESTER 0.0022MF-M 50V
25	R22	RD471J09	R, CARBON FILM 470-J1/4WM	56	C37	CC060D01	C, CERAMIC CC 6PF-D SL 50V
26	R23	RD330J09	R, CARBON FILM 33-J1/4WM	57	C26	CY621J01	C, POLYSTYROL 620PF-JR
27	R18, 28	RD101J09	R, CARBON FILM 100-J1/4WM	58	C55	CY152J01	C, POLYSTYROL 1500PF-J R
28	R1	RD121J09	R, CARBON FILM 120-J1/4WM	59	C53	CY361J01	C, POLYSTYROL 360PF- J R
29	R5, 34, 40	RD331J09	R, CARBON FILM 330-J1/4WM	60	C57	CY472J01	C, POLYSTYROL 4700PF-J
30	R17	RD391J09	R, CARBON FILM 390-J1/4WM	61	C14	CK473K02	C, CERAMIC CK 0.047MF-K 50V
31	R15, 35, 36, 37, 38	RD102J09	R, CARBON FILM 1K-J1/4WM	62	TC3, TC5, TC7	623N023B	TRIMMER T1-1-8
32	R10	RD222J09	R, CARBON FILM 2.2K-J1/4WM	63	C29	CE225F01	C, ELECTROLYTIC 2.2MF-50V
33	R4, 19, 20, 25, 26, 31	RD332J09	R, CARBON FILM 3.3K-J1/4WM	64	L8	634-020B	COIL OSC SW 2.5-7.5MHZ
34	R21	RD152J09	R, CARBON FILM 1.5K-J1/4WM	65	L9	634-020C	COIC OSC SW 7.5-23MHZ
35	R8	RD562J09	R, CARBON FILM 5.6K-J1/4WM	66	L6	634-020D	COIC ANT SW 7-22MHZ
36	R6, 16, 23, 24	RD103J09	R, CARBON FILM 10K-J1/4WM	67	C58	CC331K01	C, CERAMIC CC 330PF-K
37	R12	RD153J09	R, CARBON FILM 15K-J1/4WM	68	R9	RD473J09	R, CARBON FILM 47K-J1/4WM
38	R13	613N002F	VR, SEMI-FIXED SR19R-10KB 10D	69	R29	RD563J09	R, CARBON FILM 56K-J1/4WM
39	R42, 43	RD221J09	R, CARBON FILM 220-J1/4WM	70	R2, 3	RD104J09	R, CARBON FILM 100K-J1/4WM
40	R90	RD101J02	R, CARBON FILM 100-J1/4WR	71	R39	RD824J02	R, CARBON FILM 820K-J1/4WR
41	R92	RD122J02	R, CARBON FILM 1.2K-J1/4WR	72	C49	CQ682M01	C, POLYESTER 0.0068MF 50V
42	R41	RD681J09	R, CARBON FILM 680-J1/4WR	73	R11, 14, 91	RD682J09	R, CARBON FILM 6.8K-J1/4WM
43	R70	RD332J09	R, CARBON FILM 3.3K-J1/4WR	74	C7, 22, 23, 32, 33	CE474F01	C, ELECTROLYTTC 0.47MF 50V
44	C36, 54	CC100C01	C, CERAMIC CC 10PF-C SL 50V	75	C15, 28	CE105F01	C, ELECTROLYTTC 1ME 50V
45	C3	CC180J01	C, CERAMIC CC 18PF-J SL 50V	76	C25	CE475C01	C, ELECTROLYTTC 4.7MF-16V
46	C6	CC200J02	C, CERAMIC CC 20PF-J TH 50V	77	C19, 39	CE106C01	C, ELECTROLYTTC 10MF-16V
47	C4	CC300K01	C, CERAMIC CC 30PF-K	78	C13, 51, 59	CE476B01	C, ELECTROLYTTC 47MF 10V
48	C16	CC151K01	C, CERAMIC CC 150PF-K	79	C40	CE107B01	C, ELECTROLYTTC 100MF-10V
49	C5	CC100D06	C CERAMIC CC 10PF-D CH 50V	80	C27, 45	CE227B01	C, ELECTROLYTIC 220MF 10V
50	C21	CY102J01	C, POLYSTYROL 1000PF-JR	81	C8	CQ103M01	C, POLYESTER 0.01MF-M 50V
				82	C90	CE227B21	C, ELECTROLYTIC 220MF-10V SMALL

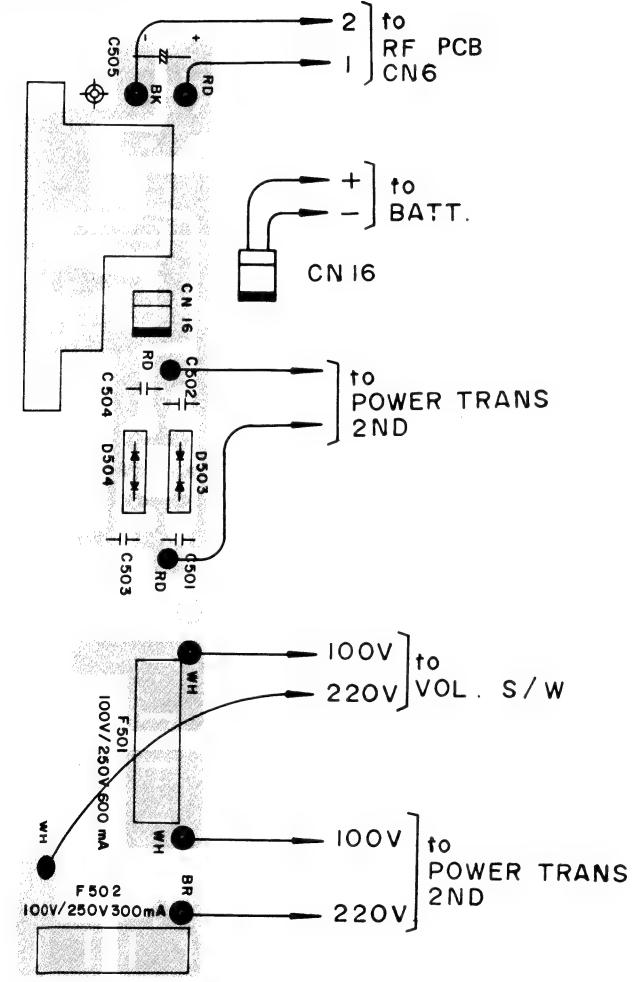
AUDIO PCB



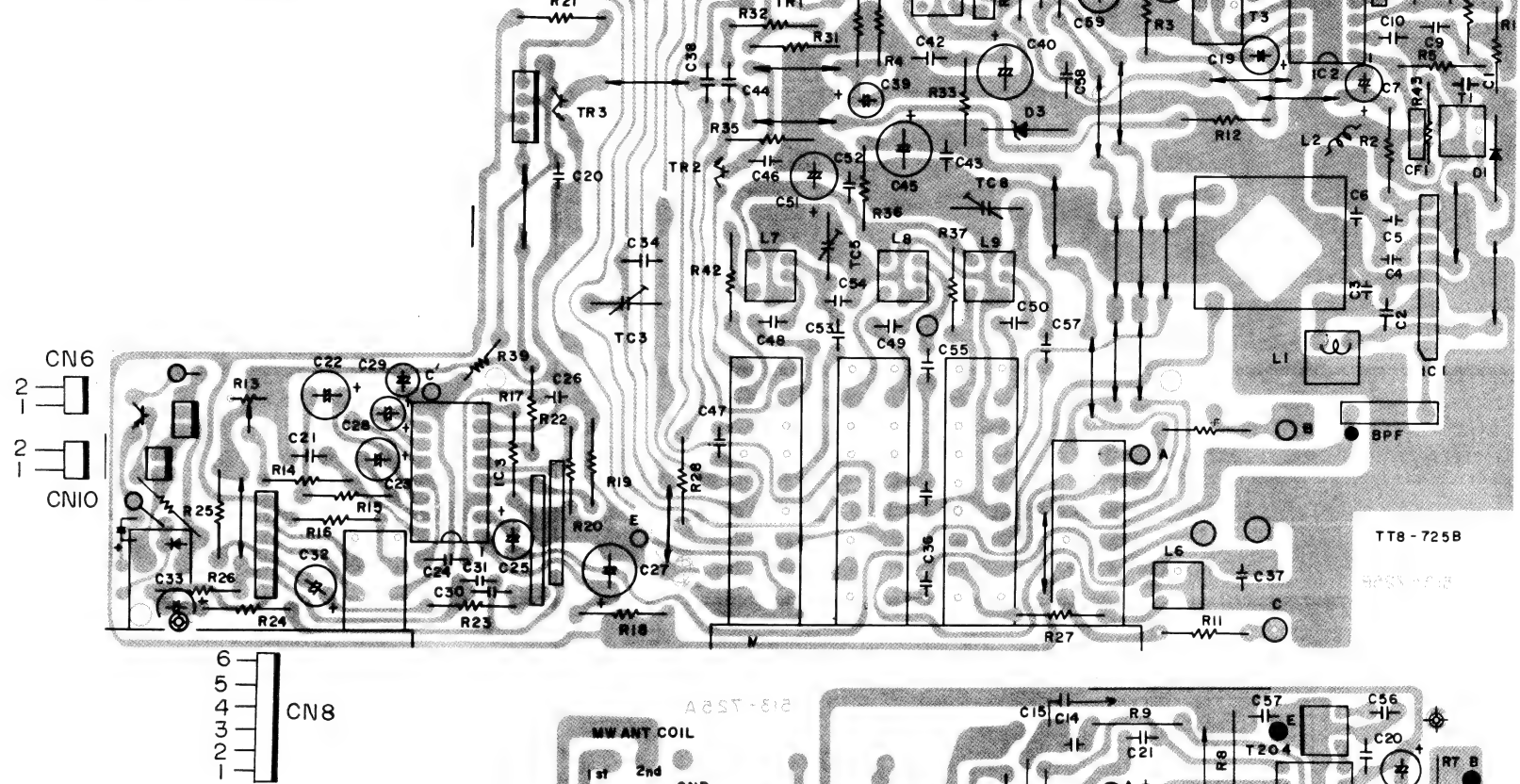
DECK PCB



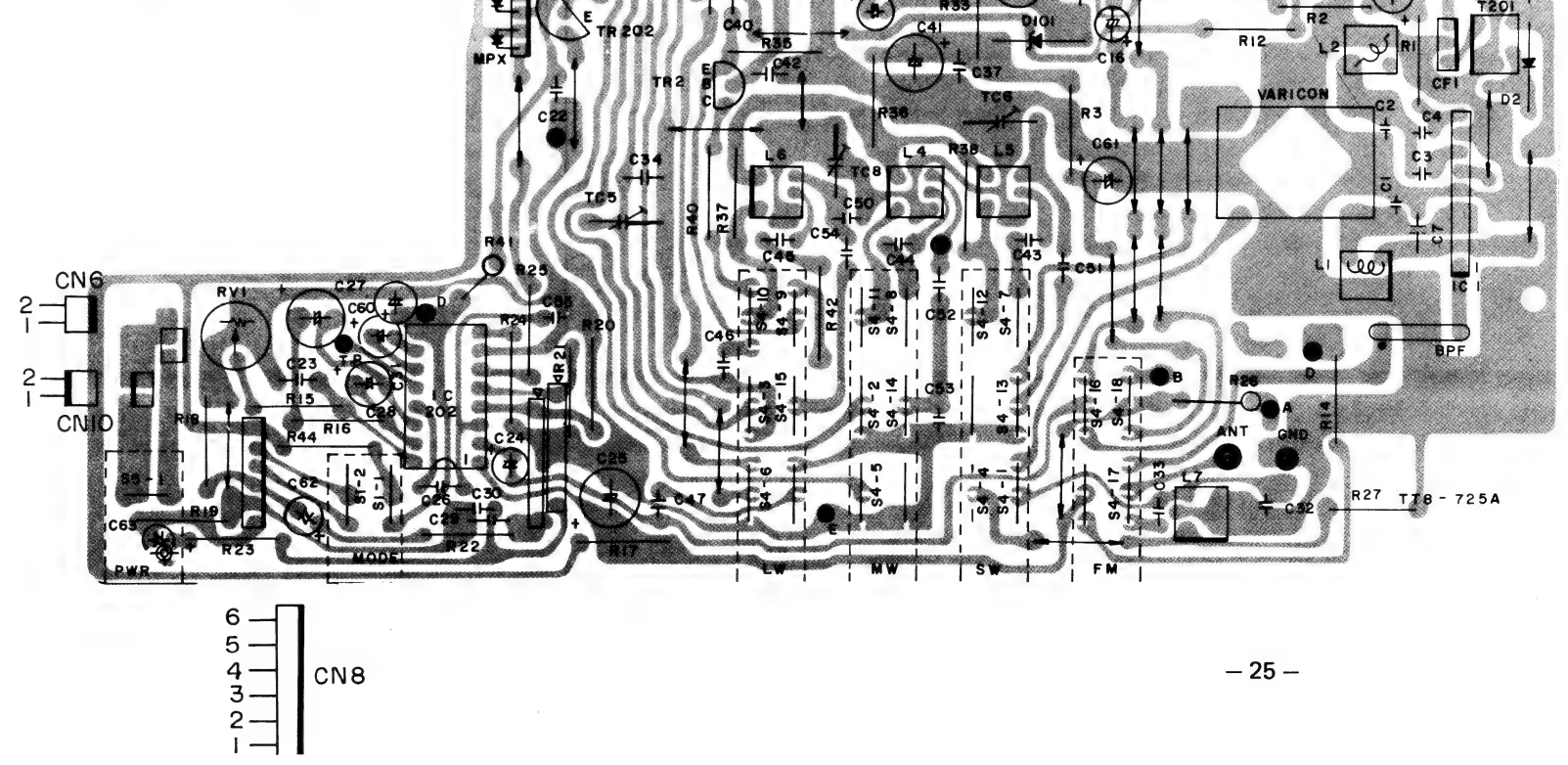
POWER PCB



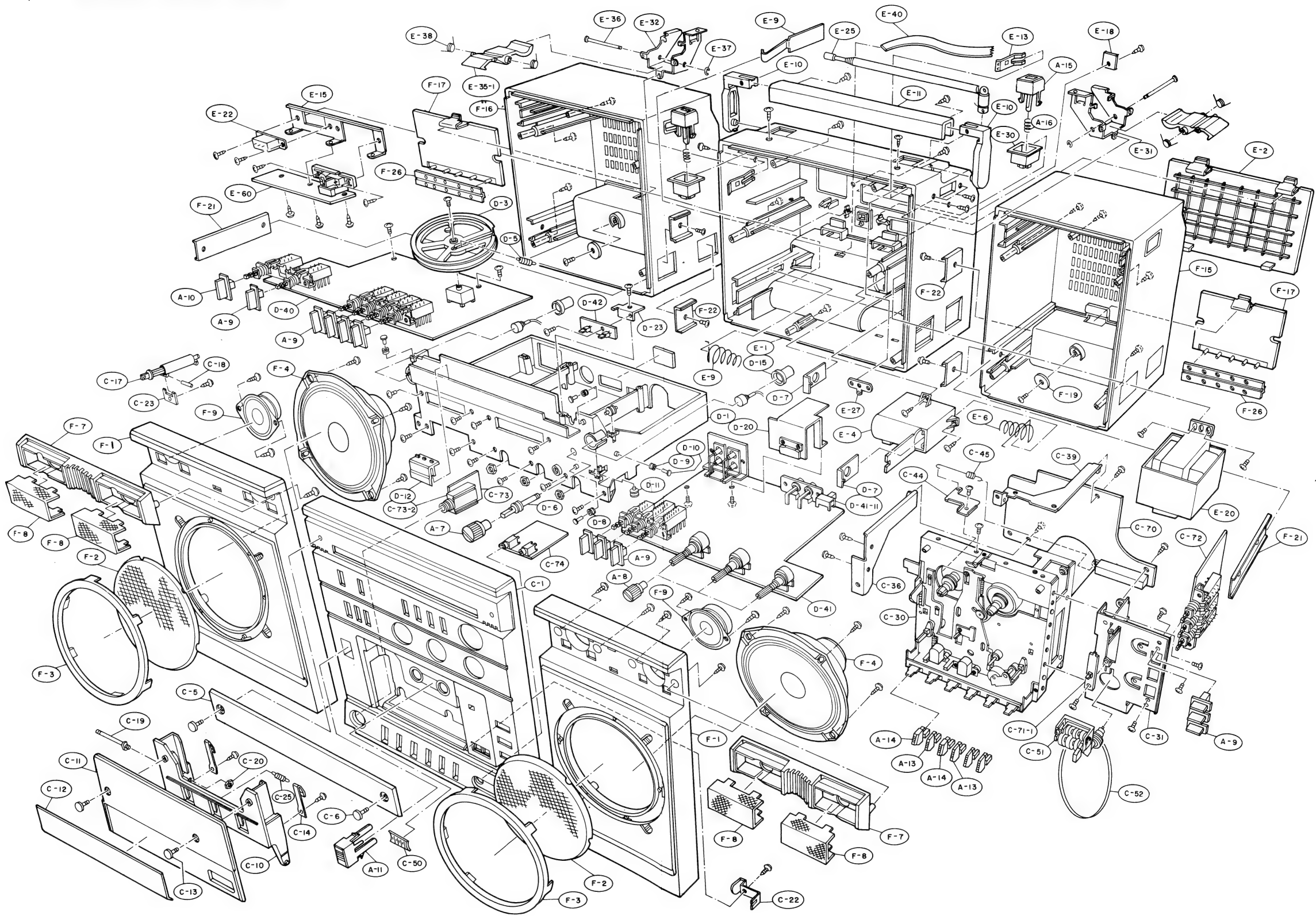
RF PCB (MODEL TSR-905)



RF PCB (MODEL TSR-900)



EXPLODED VIEW FOR CABINET



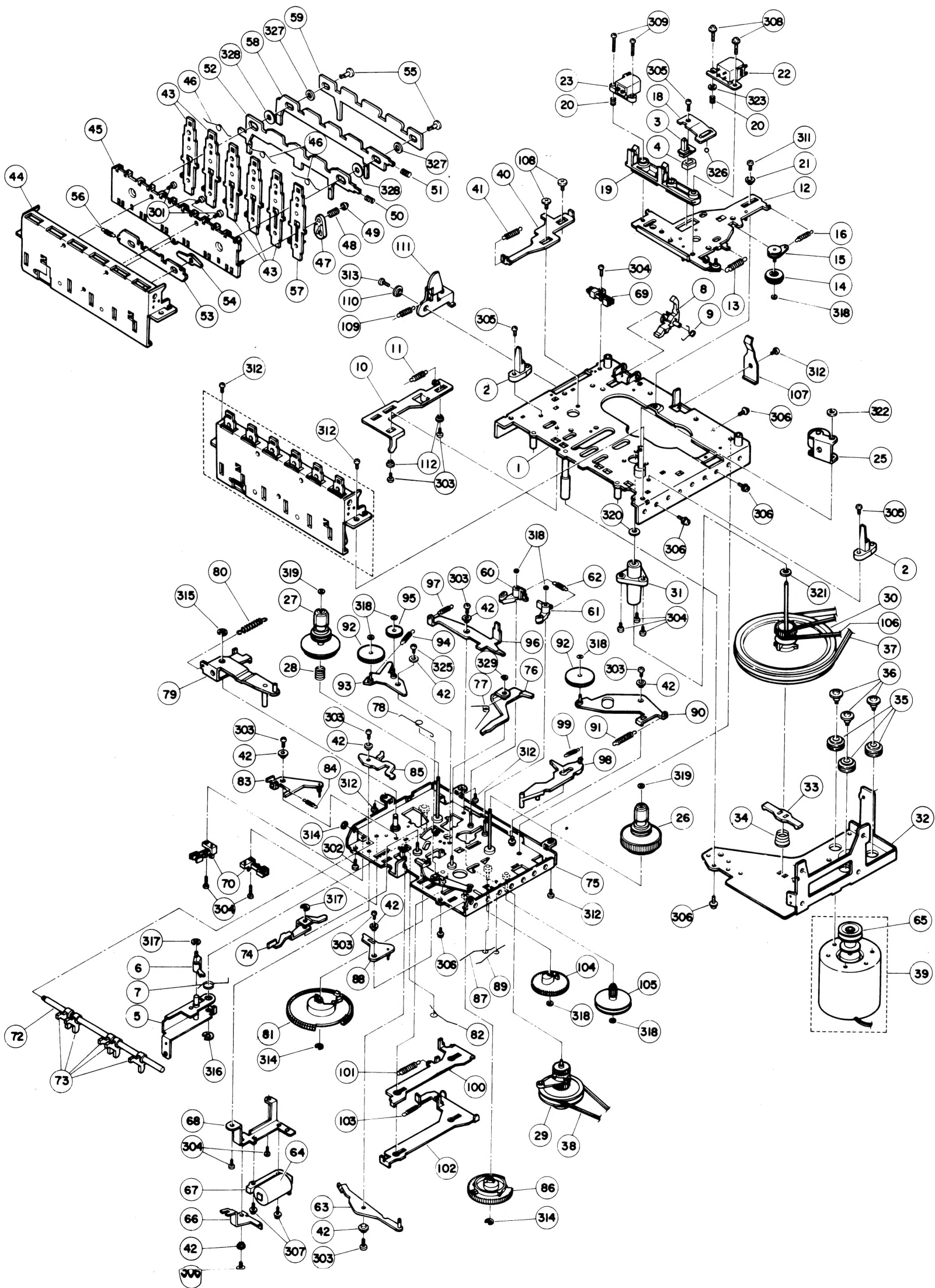
MECHANICAL PARTS LIST FOR CABINET EXPLODED VIEW

SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
A- 7	271-164A	KNOB TUNING	D- 1	313-234A	CHASSIS
A- 8	273-669A	KNOB VOLUME	D- 3	431-093A	PULLEY DIAL
A- 9	273-670A	KNOB FUNCTION	D- 5	442-004X	SPRING
A-10	273-670B	KNOB FUNCTION (RED)	D- 6	423N397A	SHAFT TUNING
A-11	273-671A	KNOB EJECT	D- 7	WEO1800Q	E-RING, WEO-3
A-12	442-664B	SPRING BUTTON	D- 8	434-018A	ROLLER
A-13	275-068A	BUTTON DECK (A)	D- 9	434N031A	ROLLER
A-14	275-069A	BUTTON DECK (B)	D-10	423N254A	SHAFT, ROLLER
A-15	275-070A	BUTTON SP	D-11	434-017A	ROLLER
A-16	442-664A	SPRING BUTTON	D-12	361-142A	POINTER
A-20	681-010A	CORD POWER	D-15	447N054A	CUSHION, MIC
C	215-255B	CASE FRONT AY	D-20	255-096A	HEAT SINK
C- 1	217-315B	CASE FRONT	D-23	321-769A	BRACKET LED
C- 5	236-165C	WINDOW SCALE (TSR-905)	D-40	511-725A	RF PWB (TSR-900)
C- 6	353-615A	SCREW, DECO	D-40	511-725B	RE PWB (TSR-905)
C-10	226-036A	DOOR CST	D-41	511-711A	AUDIO PWB
C-11	236-166A	WINDOW DOOR	D-41-11	552N020A	SLIDE SWITCH
C-12	246-038A	DECO DOOR	D-42	511-717A	TUN & ST LED PWB
C-13	353-615A	SCREW, DECO	E	215-256B	CASE REAR AY (TSR-900)
C-14	442-671B	SPRING CST PACK	E	215-256C	CASE REAR AY (TSR-905)
C-17	444-002A	DAMPER-AIR	E- 1	217-316A	CASE REAR
C-18	423-295A	SHAFT DAMPER	E- 2	221-911A	COVER BATTERY
C-19	423-294A	SHAFT PULLEY DOOR	E- 4	217-319A	CASE BATTERY
C-20	NHA1800J	NUT, NH12.6	E- 6	442N208B	SPRING BATTERY
C-21	TRQ1836J	SCREW, TRQ2+3x8	E- 7	256N334A	PLATE BATTERY A
C-22	321-779A	BRACKET DOOR	E- 8	256N335A	PLATE BATTERY B
C-23	321-780A	BRACKET DAMPER	E- 9	442N137A	SPRING BATTERY
C-25	442-662A	SPRING EJECT	E-10	324-465A	HOLDER HANDLE
C-30	412-068A	DECK MECH TN-77M-201	E-11	261-010A	HANDLE
C-31	321-763A	BRACKET DECK (A)	E-13	334N014B	STOPPER, HANDLE
C-36	321-764A	BRACKET DECK (B)	E-15	321-766A	BRACKET POWER PWB
C-37	353-022C	SCREW	E-18	221-670A	COVER VOLTAGE S/W
C-39	321-765A	BRACKET DECK (C)	E-20	641-687K	TRANS POWER (100/220V)
C-44	321-768A	BRACKET REC	E-20	641-687I	TRANS POWER (220V)
C-45	442-616C	SPRING REC	E-22	552-620A	SW, VOLTAGE SLIDE (100/220V)
C-50	256-660A	PLATE REFLECTION	E-25	532-007B	ROD, ANTENNA
C-51	517-101A	TAPE COUNTER	E-27	562N055A	LUG
C-52	451-145D	BELT COUNTER	E-30	219-043A	HOUSING SP BUTTON
C-70	511-712A	DECK PWB	E-31	219-041A	HOUSING SP HOLDER (R)
C-71	511-716A	REC LED PWB	E-32	219-042A	HOUSING SP HOLDER (L)
C-72	511-713A	TAPE SWITCH PWB	E-35	324-467A	HOLDER SP (B)
C-73	511-714A	HEADPHONE JACK PWB	E-36	423-285A	SHAFT SP HOLDER
C-73-2	572-159D	HEADPHONE JACK	E-37	WEO0900Q	E-RING, WEO-2 SK5 BK
C-74	511-715A	MIC JACK PWB	E-38	442-663A	SPRING SP
D	311-619B	CHASSIS AY FRONT	E-40	455N004E	RIBBON, BATTERY

SYMBOL NO	PART NO	DESCRIPTION	SYMBOL NO	PART NO	DESCRIPTION
F	215-257A	CASE SP AY	F-15	217-318A	CASE SP REAR
F- 1	217-317A	CASE SP FRONT	F-16	217-318B	CASE SP REAR
F- 2	365N067B	METAL SPEAKER	F-17	221-912A	COVER SP CORD
F- 3	246-037A	DECO WOOFER	F-18	564-002A	CORD SPEAKER
F- 4	541-101G	SPEAKER, 120K21-16703F	F-19	354-602I	WASHER NON METAL
F- 7	246-036A	DECO TWEETER	F-21	321-767A	BRACKET SP HOLDER
F- 8	224-047A	GRILLE TWEETER	F-22	324-466A	HOLDER SP (A)
F- 9	541-161B	SPEAKER 040N01-16603F	F-26	324-468A	HOLDER COVER SP

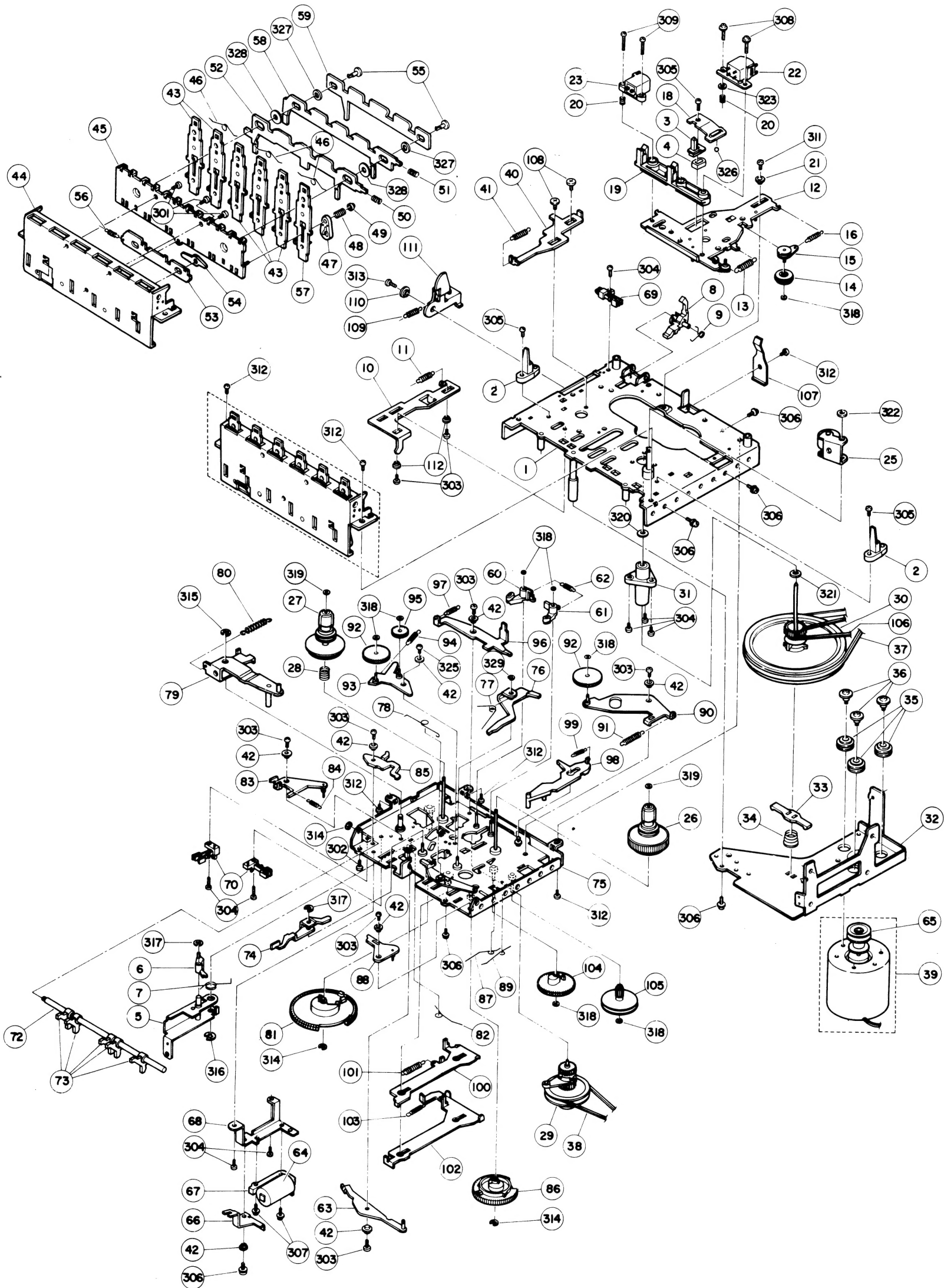
MODEL TN-77ML-13

EXPLODED VIEW FOR DECK MECHANISM



MODEL TN-77ML-13

EXPLODED VIEW FOR DECK MECHANISM



SVC PART S LIST FOR DECK MECHANISM

NO.	DESCRIPTION	PART NO.
1	CHASSIS ASS'Y	
2	CASSETTE GUIDE	99T-0001
3	GUIDE PIN	99T-0002
4	GUIDE PIN CUSHION	99T-0003
5	REC ARM ASS'Y	
6	SENSING PIECE	99T-0004
7	SENSING PIECE SPRING	
8	REC. SAFETY LEVER	99T-0005
9	REC. SAFETY LEVER SPRING	
10	REC. SLIDE LEVER	
11	REC. SLIDE LEVER SPRING	
12	HEAD PANEL ASS'Y	
13	PRESSURE SPRING	
14	TAKE UP IDLER ASS'Y	
15	TAKE UP IDLER SHAFT ASS'Y	
16	TAKE UP ROLLER SHAFT SPRING	
17		
18	PANNEL PRESS PLATE	99T-0006
19	HEAD BASE	99T-0007
20	HEAD SPRING	
21	COLLAR	
22	R.P. HEAD	99T-0008
23	E. HEAD	99T-0009
24		
25	PINCH ROLLER ASS'Y	99T-0010
26	TAKE UP REEL ASS'Y	99T-0011
27	SUPPLY REEL ASS'Y	99T-0012
28	BACK TENSION SPRING	
29	R.F. CLUTCH ASS'Y	99T-0013
30	FLYWHEEL CAPSTAN ASS'Y	
31	FLYWHEEL METAL	
32	F.M. PLATE	
33	FLYWHEEL PATCH PLATE	
34	DAMPER SPRING	
35	MOTOR RUBBER	
36	COLLAR SCREW (S)	
37	MAIN BELT	99T-0014
38	R.F. BELT	99T-0015
39	MOTOR ASS'Y	99T-0016
40	EJECT STOPPER	
41	EJECT STOPPER SPRING	
42	COLLAR	
43	BUTTON LEVER ASS'Y	99T-0017
44	FLAME ASS'Y	
45	BUTTON BASE	
46	BUTTON LEVER SPRING	99T-0018
47	PAUSE LEVER	
48	PAUSE LEVER SPRING	
49	PAUSE STOPPER	
50	FUNCTION LEVER SPRING	99T-0019
51	FUNCTION LEVER SPRING	99T-0020
53	REC. STOPPER	
54	R.F. STOPPER	
55	FUNCTION LEVER STOPPER	99T-0021
56	REC. STOPPER SPRING	
57	PAUSE BUTTON LEVER ASS'Y	
58	BUTTON FUNCTION LEVER	
59	T.P.S FUNCTION LEVER	
60	BRAKE ARM (L) ASS'Y	99T-0022
61	BRAKE ARM (R) ASS'Y	99T-0023
62	BRAKE SPRING	
63	SWITCH LEVER ASS'Y	
64	COIL ASS'Y	99T-0024
65	MOTOR PULLY	
66	KICK LEVER	99T-0025
67	YORK	
68	SOLENOID BRACKET	
69	SWITCH	99T-0026
70	SWITCH	99T-0027
71		
72	OPERATION LEVER SHAFT	
73	OPERATION LEVER	

NO.	DESCRIPTION	PART NO.
74	SWITCHING LEVER	
75	SUB CHASSIS ASS'Y	
76	AUTO LEVER	
77	AUTO LEVER SPRING	
78	SWITCH LEVER SPRING	
79	LIFT ARM ASS'Y	
80	LIFT ARM SPRING	
81	M. GEAR	
82	M. GEAR SPRING	
83	M. TRIGGER ARM ASS'Y	
84	M. TRIGGER ARM SPRING	
85	M. TRIGGER LEVER	
86	P. GEAR	
87	P. GEAR SPRING	
88	P. GEAR TRIGGER ARM ASS'Y	
89	P. GEAR TRIGGER ARM SPRING	
90	FF. G. ARM ASS'Y	
91	FF. G. ARM SPRING	
92	FF. GEAR	
93	REW. G. ARM ASS'Y	
94	REW. G. ARM SPRING	
95	REW. GEAR	
96	REGURATING PLATE	
97	REGURATING PLATE SPRING	
98	SENSING PLATE	99T-0028
100	FF. LEVER	
101	FF. LEVER SPRING	
102	REW. LEVER	
103	REW. LEVER SPRING	
104	CAM GEAR	99T-0029
105	M.P. GEAR	
106	BELT	99T-0030
107	PACK HOLD SPRING	99T-0031
108	COLLER SCREW	
109	EJECT LEVER SPRING	99T-0032
110	EJECT COLLER	
111	EJECT LEVER	99T-0033
112	COLLAR	
113		
114		
115		
301	BIND SCREW 2x3	
302	BIND SCREW 2x4	
303	C TAPPING SCREW 2x4	
304	C TAPPING SCREW 2x5	99T-0034
305	C TAPPING SCREW 2x6	99T-0035
306	TAMS SCREW 2x4	
307	TAMS SCREW 2x5	
308	CAP SCREW 2x10	99T-0036
309	PAN SCREW 2x11	
310		
311	BIND C TAPPING SCREW 2.6x6	
312	C TAPPING SCREW 2.6x4	99T-0037
313	C TAPPING SCREW 2.6x5	
314	E-RING 2.0	
315	E-RING 2.3	
316	E-RING 3.0	
317	E-RING 1.5	
318	POLYSLIDER WASHER 2.2x3x0.25	
319	POLYSLIDER WASHER 2.6x3.8x0.3	99T-0038
320	NYLON WASHER 2.5x7x0.5	
321	POLYSLIDER WASHER 2.6x6x0.3	
322	POLYSLIDER WASHER 2.1x5x0.4	99T-0039
323	WASHER 2.1-x5x0.2	
324	WASHER 2x8x0.5	
325	PAN STAPPING SCREW 2x3.5	
326	STEEL BALL 2.0	99T-0040
327	POLYSLIDER WASHER 2.5x4.7x0.13	
328	POLYSLIDER WASHER 3.5x6x0.13	
329	E-RING 1.2	
330		